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IAPME Seminar

Introduction of Broadband and modifiable electromagnetic wave absorbing cement-based materials

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Venue: N23-1004b
Time: 10:30 - 11:30
Hosted by: Prof. Guoxing SUN

Abstract

With the advancement of radar detection technologies, the protection and concealment of engineering structures have become increasingly challenging. Based on the principle of radar detection, it is imperative to conduct research on new cement-based electromagnetic wave-absorbing materials (EWAM) and their environmental compatibility. Currently, existing cement-based composites suffer from issues such as narrow absorption bandwidth, lack of dynamic regulation of wave-absorbing performance, and poor environmental compatibility. In this study, a design method for EWAM based on structural design and component optimization is proposed, and wedge-shaped EWAM with strong absorbing performance are successfully prepared, with effective bandwidths of 15.2 GHz (< -10 dB) and 12.9 GHz (< -20 dB), and an average reflectivity of -27.1 dB. By fabricating magnetofluid tubes and magnetofluid capsules, dynamically modifiable EWAM with flat structures, laminated structures, porous structures, and wedge structures are developed. Dynamic regulation of the minimum reflectivity, average reflectivity, and effective absorption bandwidths have been achieved. In addition, an evaluation method for the compatibility between EWAM and environmental wave-absorbing performance is proposed, and EWAM matching desert and grassland environments are successfully prepared. The development of EWAM with broadband and modifiable wave-absorbing properties is of great significance for mitigating electromagnetic radiation pollution, enhancing the protective capacity of buildings, and safeguarding national and people's lives and property.

Biography

Prof. Qijun YU, obtained his Ph.D. in Engineering, currently a Professor at South China University of Technology, Doctoral Supervisor, Distinguished Professor of the Pearl River Scholars Program in Guangdong Province, Outstanding Teacher of Guangdong, and Recipient of the State Council‘s Special Allowance. Prof. Yu has been engaged in fundamental and applied research on solid waste comprehensive utilization, composite cement chemistry, low-energy consumption preparation and efficient application of cement, and the environmental impact of the cement industry for a long time. He has published over 300 papers in authoritative journals in the fields of cement, concrete, and solid waste resource utilization, such as Cement and Concrete Research, Cement and Concrete Composites. He has also been granted 58 authorized or published invention patents.